CLAIMS

We claim:

1. A float switch system for limiting to desirable levels current and energy entering a tank of combustible liquid, said system comprising:

a float switch disposed within said tank;

an interface circuit external to said tank and coupled through wiring to said float switch;

a passive transient suppression circuit coupled to said wiring external and in proximity to said tank, and operative to limit current and energy entering said tank over said wiring to the desirable levels; and

a control circuit coupled to said float switch through said transient suppression circuit and to said interface circuit, said control circuit operative to monitor the status of said float switch with current within the desirable current level and to energize said interface circuit based on said switch status.

2. The system of claim 1 wherein the interface circuit is rendered energized with current greater than the desirable current level.

3. The system of claim 1 wherein the interface circuit is disposed a substantial distance from the transient suppression circuit over wiring that is exposed to potential short duration and sustained threats; and wherein the transient suppression circuit is operative to maintain current and energy to the tank over the wiring to within the desirable levels notwithstanding a coupling of any one of said threats to the exposed wiring.

4. The system of claim 3 wherein the control circuit is disposed in proximity to the transient suppression circuit.

5. The system of claim 4 wherein the control circuit comprises a first circuit coupled to the float switch through the transient suppression circuit for monitoring the status of the float switch with current limited by an impedance of the transient suppression circuit; and a second circuit including a switch circuit controlled by the first circuit to energize the interface circuit based on said monitored status.

6. The system of claim 5 wherein the first circuit comprises a pair of current mirror circuits for monitoring the status of the float switch.

7. The system of claim 5 wherein the second circuit comprises both a high side drive connection and a low side drive connection.

8. The system of claim 5 wherein the switch circuit comprises a solid-state switch driven by the first circuit.

9. The system of claim 5 wherein the passive transient suppression circuit comprises a resistor network; and wherein the first circuit is coupled to a ground connection through the resistor network and float switch.

10. The system of claim 9 wherein the passive transient suppression circuit comprises capacitance coupled from said resistor network to the ground connection.

11. The system of claim 3 wherein the control circuit is disposed in proximity to the interface circuit and coupled to the passive transient suppression circuit over the exposed wiring.

12. The system of claim 11 wherein the control circuit comprises an electro-mechanical device coupled to the float switch through the exposed wiring and transient suppression circuit, said electro-mechanical device including a contact responsive to the status of the float switch for energizing the interface circuit.

13. The system of claim 12 wherein the contact rendering an electrical isolation between the exposed wiring and the interface circuit.

14. The system of claim 13 wherein the electro-mechanical device comprises a relay responsive to the status of the float switch and energized by a current within the desirable current level.

15. The system of claim 14 wherein the energization current of the relay is limited by an impedance of the transient suppression circuit; and wherein the relay is operative notwithstanding a voltage drop across the transient suppression circuit resulting from the energization current.

16. The system of claim 11 wherein the control circuit comprises a first circuit coupled to the float switch through the exposed wiring and transient suppression circuit for monitoring the status of the float switch with current limited by an impedance of the transient suppression circuit; and a second circuit including a switch circuit controlled by the first circuit to energize the interface circuit based on said monitored status.

17. The system of claim 16 wherein the first circuit comprises a pair of current mirror circuits for monitoring the status of the float switch.

18. The system of claim 16 wherein the switch circuit comprises a solid-state switch driven by the first circuit.

19. The system of claim 16 wherein the passive transient suppression circuit comprises a resistor network; and wherein the first circuit is coupled to a ground connection through the exposed wiring, resistor network and float switch.

20. The system of claim 19 wherein the passive transient suppression circuit comprises capacitance coupled from said resistor network to the ground connection.

21. The system of claim 1 wherein the control circuit comprises a voltage limiting circuit for protecting the circuitry of the control circuit from short duration threats.

22. The system of claim 21 wherein the voltage limiting circuit comprises voltage transient suppression and capacitive elements.

23. The system of claim 1 wherein the float switch system is disposed on an aircraft for limiting to desirable levels the current and energy entering a fuel tank of said aircraft.

24. The system of claim 23 wherein the interface circuit comprises any one of the group consisting of a fuel control valve, a fuel transfer valve, a relay, a solenoid, and a fuel level indicator.

25. The system of claim 23 wherein the interface circuit is disposed a substantial distance from the transient suppression circuit over wiring that is exposed to potential short duration and sustained threats; and wherein the transient suppression circuit is operative to maintain current and energy to the fuel tank over the exposed wiring to within the desirable levels notwithstanding a coupling of any one of said threats to the exposed wiring.

26. The system of claim 25 wherein the control circuit is disposed in proximity to the interface circuit and coupled to the passive transient suppression circuit at the fuel tank over existing aircraft wiring.

27. The system of claim 26 wherein the passive transient suppression circuit comprises a resistor network; and wherein the control circuit is coupled to a ground connection at the fuel tank through the exposed wiring, the passive transient suppression circuit and float switch.